

AD-A155 068

HIGH ALTITUDE NUDET PHENOMENOLOGY

Second Quarterly R&D Status Report
1 February 1985 - 30 April 1985

Principal Investigator,
T. H. McCartor
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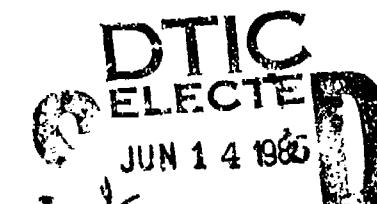
May 1985

Effective Date of Contract: 1 November 1984

Contract Expiration Date: 30 September 1985

Mission Research Corporation
735 State Street, P.O. Drawer 719
Santa Barbara, California 93102

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1 May 1985

LtC Michael A. Stamm
AFTAC/TXN
Patrick AFB, FL 32925

Subject: F08606-85-C-0005

References: MRC C-85047/85084

Dear LtC Stamm:

Enclosed are two copies of the quarterly R&D Status Report, as required by CDRL 003A2 of the subject contract. This report covers the period ending 30 April 1985.

Very truly yours,



Kimberly M. Goldstein
Contracts Administrator

KMG/k

Enclosures: Two

cc: DARPA, PM (3)
DDC (2)
Sandra Willis (Letter Only)
DCASMA, Oxnard (Letter Only)

DISCUSSION

A major effort during the past quarter has been our preparation for and our participation in the Thirteen Annual Satellite Working Group meeting held at PAFB, 12-14 March 1985. One paper was presented at the meeting: "The Optical Pulse from a Nuclear Detonation," by Trella H. McCarter.

We have been continuing to generate a data base of optical signals (at a variety of wavelengths). These simulated optical signals depend on both the burst point density and on weapon parameters.) The data base matrix of simulations consists of the yields and altitudes shown in Table 1. The x's indicate completed simulations this quarter; the y's indicate completed simulations last quarter. This quarter we have completed the 1, 100, 1000 and 10000 KT simulations for all altitudes. From these simulations we have generated optical signals in the silicon, S₄, visible, thermal, blue, green, red, broadband and narrow infrared bandpasses.

Table 1. Date base matrix of simulations.

YIELD (kt)	Altitude (km)						
	0	10	18	33	48	67	82
1	x	x	x	x	x	x	x
10	y	y	y	y	y	y	y
100	x	x	x	x	x	x	x
1000	x	x	x	x	x	x	x
10000	x	x	x	x	x	x	x
100000							

We have made the MODEL3 code operational on the ELXSI computer at MRC and have successfully completed a 100 KT simulation at 82 km. However, at this time, the MODEL3 code is far from being run in a

production mode. We plan on making MODEL3 runs to check the RADFLO results at 82 km.

($t_{\text{sub}1\text{MAX}}$) ($t_{\text{sub}1\text{MIN}}$) ($t_{\text{sub}2\text{MAX}}$)

We have also applied John Zinn's scaling laws for estimating the yield of a nuclear detonation from critical times ($t_{1\text{MAX}}$, $t_{1\text{MIN}}$ and $t_{2\text{MAX}}$) in the optical pulse to the RADFLO simulated data base. The Zinn scaling relationships for the visible and silicon responses were designed from low altitude data bases and the scaling laws produce large errors. However, Zinn's scaling rules for the S_4 detector explicitly include burst point density and his S_4 scaling relationships accurately estimates the yield up to an altitude of approximately 30 km (until the minimum in the optical signal disappears). Although the S_4 detector is not flown on any satellite platforms, this set of laws is being included for completeness in our review of existing scaling laws.

VISITS

To PAFB, 12-18 March 1985

There were three purposes for this visit.

- (1) To participate in the Thirteenth Annual Satellite Working Group meeting.
- (2) To have technical discussions with LtC Michael R. Stamm and Mj. Robert A. Warren, and
- (3) To determine if the data tapes generated by RADFLO containing the simulated optical signals could be read by the IBM computer at AFTAC.



John Smith

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To DARPA, 12 April 1985

On this visit the status of this program was discussed with Major George Lasche.

FISCAL STATUS

On 30 April 1985, \$77,175.00 have been spent on the contract, leaving \$99,126.00. There are no administrative problems.